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Editorial

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1. HONORARY EDITOR'S OPENING REMARKS

I am pleased to welcome you to the June issue of *Geotechnical Engineering*. This is one of our special themed issues, 'The Geotechnics of Tunnelling'. While I wish to make some opening comments Brian McGinnity, who has co-ordinated this issue, has provided the main editorial.

In my February editorial I mentioned that I would introduce new panel members who have started a three-year term this year and I am pleased to welcome: David Shohet from the NHBC, Matthew Baldwin from Norwest Holst Soil Engineering, Paul Nowak of Atkins Water & Environment, Bill Craig from the University of Manchester and Nebojsa Kovacevic of Geotechnical Consulting Group. We were also able to welcome five new members from outside the UK: Ken Gavin from University College Dublin, Trevor Orr from Trinity College Dublin, Chris Howley of Mott MacDonald (Hong Kong), Susan Gourvenec from the University of Western Australia and Elisabeth Bowman from the University of Canterbury New Zealand.

It has long been an aim to have the editorial advisory panel membership drawn from client companies, contractors, consultants and academia. We have continued that approach this year although I note that the representation from contractors has fallen. We will lose a number of panel members who have completed their three years on the panel at the end of this year. It would be encouraging to see a greater proportion of contractors nominated for potential panel membership this year; if you would be interested in joining the editorial panel please express an interest to me or my panel colleagues.

The themed issues of *Geotechnical Engineering* have proved to be very popular in terms of readership and with regard to the numbers of papers submitted for review. I'd like to thank Brian, and the subcommittee responsible for the themed issue, for distilling these submissions down to six very interesting papers. We would be delighted to see written discussion arising from the topics covered; the details for submission of discussion may be found at the end of each paper. As with each of the themed editions we have increased the length of this issue and I hope you enjoy the papers we have included.

2. EDITORIAL

This special issue on 'The Geotechnics of Tunnelling' is one of the ongoing series of themed issues which focus on particular areas of interest to the profession.

There is £20 billion of tunnelling work planned in the UK over the next 10 years including Crossrail, Thames Tideway, London Underground station capacity upgrades and host of smaller but still significant transport water and cable tunnels. This special issue of *Geotechnical Engineering* highlights some recent developments associated with tunnelling geotechnics that are anticipated to be of use to the underground construction engineering practitioner working on these and similar projects.

The call for papers requested papers on seven main topics associated with the application of geotechnical engineering in tunnelling, namely

- case histories
- geotechnical investigation and monitoring
- geotechnical analysis and modelling
- tunnelling induced deformation including comparison with predictions
- ground improvement associated with tunnels
- tunnel asset management- inspection, assessment and maintenance
- current research.

There are six papers in this special issue covering a diverse range of geotechnical engineering applied to tunnelling construction. The first paper by Devriendt (2010) describes a quantitative risk analysis process that can be used for assessing the uncertainties associated with the level of damage that structures will be subjected to as a consequence of ground movement arising from tunnelling. The ability to accurately predict the level of damage to structures and have confidence in the appropriateness of any protective measures is of increasing importance to the viability of urban tunnelling.

Conventionally structural deformation in tunnels has been measured using strain gauges. Recently optical fibre strain sensors whose operation is based on Brillouin scattering, and Brillouin optical time-domain reflectometry (BOTDR) equipment has been developed for practical use in civil engineering. The paper by Cheung *et al.* (2010) describes a trial strain monitoring system to monitor concrete segment joint movement in an existing London Underground tunnel using BOTDR technology. The results indicate that BOTDR has many unique advantages over conventional discrete strain measurement in particular providing a continuous strain distribution over the entire tunnel lining.

Demolition, excavation and construction of new developments adjacent to existing tunnels modifies the ground loading resulting in a complex change in the existing tunnel stress distribution. Devriendt *et al.* (2010) presents a case history of the One New Change development in Central London and its effect on the adjacent London Underground Central Line tunnels. The paper provides a useful comparison between predicted and measured tunnel deformation as a result of significant adjacent construction activity.

The paper by Bennett *et al.* (2010) describes the use of a hybrid wireless sensor network for the monitoring of tunnels. A wireless sensor network often significant advantages over a conventional wired system namely: it consumes very little power, is capable of fast real-time data acquisition, is reliable and accurate over the long term, costs little to purchase and install, and requires no real maintenance.

The establishment of a reliable pre-construction geological model and continual verification of this model during construction by observation is fundamental to mitigate the risk to the health and safety of underground personnel tunnelling. Newman *et al.* (2010) illustrate how geological modelling was used for early identification and prediction of adverse ground conditions, enabling the planning of contingency procedures for the construction of an extension to the Thames Water Ring main in North London using a closed face tunnel-boring machine (TBM). By logging the spoil arising from the closed-face TBM, which largely conceals the excavation face ground conditions the site team was able to assess the accuracy of predictions made from the ground model and reduce the risks posed from unforeseen ground hazards.

Finally in this special issue Jones (2010) presents predictions for, and actual sub surface movement measurements of, underground structures adjacent to an extension to the Thames Water Ring main tunnel in North London. This case history indicated that the tunnelling settlement trough width parameter K did not vary with depth as predicted, leading to a new relationship being proposed

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